



**International  
Science Council**

**International Decade of Science for Sustainable Development**

## **Distinguished Lecture Series**

Following the successful distinguished lecture series launched in 2022 in support of the International Year of Basic Sciences for Sustainable Development (IYBSSD), the International Science Council GeoUnions are launching a new lecture series in recognition of the ratification by the United Nations of the International Decade of Sciences for Sustainable Development (IDSSD).

The lectures are aimed at highlighting the importance and role of science in achieving the Sustainable Development Goals and will be of interest to researchers and students.

The second in the new series is to be presented by Professor Yongguan ZHU on **Tuesday 12<sup>TH</sup> November 2024 at 10h00 UTC (GMT)**. Attendance is free, join the session on Zoom here:

<https://url.za.m.mimecastprotect.com/s/nRYYCY6YG5tL26A6NF0fGFxPjJh>

### **“Antimicrobial resistance in the ecosystem: A One Health approach”**

**Professor Yongguan ZHU**

Director General of the Research Center for Eco-environmental Sciences, CAS

The microbiome contributes to ecosystem sustainability and human health through complex interactions between the physical environment and other organisms dwelling in that environment. Given the enormous diversity and functions performed by ecosystem microbiomes, in this presentation, I will use antimicrobial resistance (AMR) as an example to explore microbial connectivity across entire ecosystems. We find that both urban wastewater treatment plants and intensive animal farms are major sources of AMR pollution in the environment. Once anthropogenic AMR enters the environment, it can be spread through mass microbial movement within the ecosystem and transported through various pathways at regional and even global scales. I will highlight the application of single-cell methodologies for in situ analysis of AMR, specifically targeting the "distribution-diffusion-development" (3D) process of active antibiotic-resistant bacteria (ARB). Targeted single-cell sorting and metagenomics make it possible to pinpoint “who is doing what and how” in the most active ARB, and to track the physiological evolution of resistance and analyze the underlying genetic mechanisms. In summary, AMR within the ecosystem can be cycled between humans, animals, plants and the environment, and we should adopt the One Health framework in assessing microbial cycling.

**Professor Yongguan ZHU** is Academician of the Chinese Academy of Sciences (CAS), Fellow of TWAS (The World Academy of Sciences), Fellow of International Science Council (ISC), and is the Director General of the Research Center for Eco-environmental Sciences, CAS. He has been working on environmental health and well-being issues related to pollution, soil biodiversity and microbial ecology. He was a scientific committee member for ISC program on Human Health and Wellbeing in Changing Urban Environment, and is a member of the Committee of Science Planning of ISC. He served for nine years as a member of the Standing Advisory Group for Nuclear Application, International Atomic Energy Agency (2004-2012). He has received numerous merit awards, including TWAS Award for Agricultural Science 2013, National Natural Science Award 2009 & 2023, International Union of Soil Science von Liebig Award 2022. He publishes widely in international journals with an H-index of 126 (Web of Science), and has been selected as a Web of Science Highly Cited Researcher (2016-2024).

